COMPREHENSIVE RESPONSE TO COMMENTS ON SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT AOC-4 FALCON REFINERY SUPERFUND SITE

U.S. Environmental Protection Agency (EPA) Comments Received on 11 April 2014

EPA Comment No. 1 (4-11-14):

The ecological exclusion screening worksheet (App A) is not used by Superfund in Region 6. I believe that this worksheet is from TCEQ guidance. Some people in RCRA may have adapted this form but it has not been used by Superfund. It would be appropriate to leave this worksheet in as an appendix, if it is properly identified as a TCEQ worksheet, as this shows compliance with state regulations. This worksheet cannot be used in an EPA risk assessment to demonstrate lack of habitat or the disturbed nature of the site. The text in the document will need to spell out the reasons for making the determination that the site is disturbed. The text will need to make a strong argument to support this decision.

Here is a list of things that I look for when evaluating urban and disturbed property. Please address these conditions in the text of the document.

- Potentially sensitive environmental areas exist on, adjacent to, in proximity to, or within 500 feet of the boundary of the site. Any such area is considered to be in proximity to a site if the area is directly affected by site activities or contaminants, or if receptors utilizing the sensitive environmental area(s) also utilize habitats on-site. A distance of 500 feet was selected because it is reasonable to assume that contaminants can easily migrate over shorter distances.
- Areas of contiguous undeveloped land exist adjacent to, in proximity to, or within 500 feet of the boundary of the site.
- "The site is located on, or directly adjacent to, an area where management or land use plans will maintain or restore native or semi-native vegetation (e.g., greenbelts, protected wetlands, forestlands, locally designated environmentally sensitive areas, open space areas managed for wildlife, and some parks or outdoor recreation areas)" Consideration is given to whether site-related contaminants of potential concern (COPCs) or activities affect these areas.
- Transport pathways exist from the primary source of contamination to areas of contiguous undeveloped land or surface water on-site or in proximity to the site.
- The site is used by Federal or state listed threatened, endangered or protected species.
- If future land use plans will lead to the restoration of any portion of the site to "natural" conditions, a full ERA must be conducted to determine if proposed future land use will result in risk to ecological receptors.

If none of the above conditions are present in this AOC then we can proceed under the assumption that the property is disturbed and a full baseline ecological risk assessment is not needed. I would encourage EA to fully document any conditions that would strengthen the argument that the AOC is disturbed. In these cases we look for conditions like the ones listed below.

- The site is wholly contained within contiguous land characterized by pavement, buildings, roadways, equipment storage areas, manufacturing of process areas, or other structures or covers, and/or
- There are physical barriers that eliminate exposure of receptors to contaminated media that will not be disturbed by remediation or by the intended future land use and/or
- All COCs present in soil are located deeper than five feet below ground surface, and surface soils will not be removed or disturbed.

If the case has been made that the site is disturbed, then we may be able to assume that chronic exposure is unlikely at this AOC. In this case acute values could be used for evaluating risk to measurement receptors.

EA Response: Reliance upon the Exclusionary Criteria worksheet previously presented in Appendix A as part of the Screening Level Ecological Risk Assessment (SLERA) has been eliminated. The Exclusionary Criteria worksheet has been removed, and a complete SLERA conducted on AOC-4 as per discussions with EPA. Not all of the conditions mentioned in the comment could be met, as future land use could not be documented and the site borders AOC-5 in the Intracoastal Waterway (ICW; sensitive environmental habitat within 500 feet); therefore, the SLERA evaluates chronic exposures.

In place of the worksheet, the conceptual model has been revised to include a more robust description of current conditions at the site. This includes the fact that site soils consist of pavement and highly compacted silty sands as supported by evidence from aerial photographs and observations. These site conditions support a number of lines of evidence considered in risk characterization, including the following:

1. Land at the site is characterized by pavement, buildings, and processing areas and is contained by fencing. This limits the amount of suitable habitat within the site and prohibits movement of larger wildlife receptors.

2. Current land use is industrial and expected to remain so; should the site be restored to viable habitat in the future, the transition would involve major changes to soil substrates, including the removal of paving, alteration of compacted conditions and unsuitable grain size, and increases in organic matter. All of these constitute physical changes that would likely supersede and overwhelm the influence of the chemical concentrations detected, serving to dilute or diminish the influence of chemical concentrations that are already relatively low.

3. The small size of the site and its habitat value was considered in light of home range of wildlife receptors (American robin and shrew) in comparison to site area and total population.

4. Site conditions were considered in light of fate and transport. The compacted nature of site soils decreases the likelihood that flooding events (i.e. those associated with a hurricane) would create significant contaminated soil runoff into the ICW.

EPA Comment No. 2 (4-11-14):

TCEQ should be consulted regarding the APP A ecological exclusion worksheet.

> **EA Response:** Reference and use of the Exclusionary Criteria (Appendix A) has been removed and a complete SLERA was conducted for AOC-4 as per our discussions.

EPA Comment No. 3 (4-11-14):

The statements made about steps of the ERA not being necessary due to the Ecological Exclusion Worksheet will need to be removed throughout the document. The statements made about no further ecological evaluation due to disturbed nature will also need to be removed unless additional supporting information is provided in the report. An abbreviated ecological risk assessment using acute values will be needed even for disturbed property. This includes the selection of assessment endpoints, measurement receptors, and identification of pathways to be evaluated. The comparison to acute values should be done with COPECs that remain after screening with max values (COPCs listed on page 10). Acute values should come from EcoSSLs if possible.

> **EA Response:** All statements referring to the use of Exclusionary Criteria have been removed and a complete SLERA has been conducted for AOC-4. The Exclusionary Criteria (Appendix A) has been deleted, and instead habitat characteristics of AOC-4 were included as part of the risk characterization for each receptor (plants, soil invertebrates, insectivorous birds, and insectivorous mammals).

EPA Comment No. 4 (4-11-14):

A comparison to background values should be presented. If no background values are available then a comparison to TX specific soil background concentrations should be presented. The comparison should not be used as a screen, but it can be noted that PRGs will not be needed for COPECs that are below background as EPA does not remediate below background values.

> **EA Response:** Background values were available for metals and have been included as Table 17 and in Section 2.7. Chemicals of Potential Ecological Concern (COPECs) above background concentrations were identified and those below were noted as chemicals where Preliminary Remediation Goals will not be needed.

EPA Comment No. 5 (4-11-14):

Information on the potential for floods and hurricanes in the area should be provided along with an evaluation of the potential migration of COPCs from this AOC during these events.

> **EA Response:** A discussion of risks associated with the potential for hurricanes and flooding during large storm events has been added to Section 2.2.5 under *Fate, Transport, and Media of Concern.*

EPA Comment No. 6 (4-11-14):

A discussion of ARARs and any values that exceed ARARs is needed.

Typically not included.

EA Response: There are no soil environmental ARARs. Water quality standards have been addressed in the separate AOC-5 document.

EPA Comment No. 7 (4-11-14):

A discussion of future use is needed. Are any instructional controls in place? What evidence exist the area will remain an industrial area?

EA Response: EA performed due diligence in determining whether or not any institutional controls were in place regarding future use of the site. Although there are no restrictions or institutional controls documenting that the property will remain industrial for future use, the Deed No. 615663 has a section called "Assumption of Obligations" and states that the "Falcon Refinery" has been designated by the EPA as a Superfund Site, and is subject to remediation and clean-up in connection with two (2) Administrative Orders On Consent. This language was added to Section 2.2.2. In addition, a discussion highlighting the major physical changes that would occur to the site should it ever be restored to habitat (including the removal of paving, alteration of compacted conditions and unsuitable grain size, and increases in organic matter) has been added. All of these constitute physical changes that would likely supersede the effects of chemical concentrations which may serve to dilute or diminish the influence of chemical concentrations and has been factored into the risk characterizations in Section 2.6.

EPA Comment No. 8 (4-11-14):

Page 6, Threatened and endangered species. – This section should discuss the likelihood that T&E species will utilize habitat in, or bordering this AOC. This should be done for each T&E species.

EA Response: The list of threatened and endangered species has been updated to reflect AOC-4 only (and not AOC-5's aquatic habitat). A brief discussion highlighting habitat requirements and the likelihood that each species will utilize AOC-4 has also been included.

EPA Comment No. 9 (4-11-14):

Figure 2- Please change the color of the border for AOC4 so it will be clear what is being evaluated. AOC 3 needs to be labeled better. The AOC label is outside area and is confusing.

EA Response: Figure 2 has been revised with the color of the border for AOC-4 modified to a more distinct color and the area for AOC-3 labeled better.

EPA Comment No. 10 (4-11-14):

Figure 5, CSM- The primary source of contamination should be shown on the CSM. This would be the historical releases or the other sources of contamination. The soil pathway for plants, soil invertebrates, birds, mammals, and reptiles needs to be evaluated. This should be noted on the

CSM. If the habitat evaluation shows presence of food sources then exposure to the terrestrial food chain should be shown as complete and evaluated.

EA Response: The Conceptual Site Model (Figure 5) has been updated to reflect the primary source of contamination and the complete pathways where applicable now that Exclusionary Criteria are not being applied to the site.

EPA Comment No. 11 (4-11-14):

Table 3 Ecological screening benchmarks. TCEQ screening benchmarks should be used when available. Several of the chemicals listed show NA when TX screening values are available.

EA Response: Texas Commission on Environmental Quality screening benchmarks have been included on Table 3 and were used when they were the lowest screening value available.

EPA Comment No. 12 (4-11-14):

Figure 4: If possible, the locations where composite sample FR-133A was collected should be shown or a description of how sample was collected should be added to the figure legend.

EA Response: Upon further review of the data used in the SLERA in response to this comment, we identified that one of the samples included (FR-133A) was subject to data type/data quality issues and should be excluded from the SLERA. In specific, the sample represents a composite (and not a discrete sample); risk assessment does not typically include composite samples in calculations. Also, there are discrepancies between the electronic data received for this sample and the results reported in the site closure report. Therefore, Figure 4 and Table 1 now correctly reflect the sample locations/data used in this SLERA.

EPA Comment No. 13 (4-11-14):

In addition to table 4, data tables for all sampling data in AOC4 should be included in this document.

EA Response: The data table for AOC-4 has been included as Appendix A.

EPA Comment No. 14 (4-11-14):

APP A #3: The nearest water body is redfish bay. The wetland is further away. This should be discussed in the worksheet. The response needs to indicate the distance to the wetland. The response needs to indicate one water body is marine and one is brackish wetland if this is the case.

EA Response: Appendix A (Exclusionary Criteria) has been removed from the document.

EPA Comment No. 15 (4-11-14):

APP A #4: Need to answer the following question in the worksheet. Is migration coming from AOC4 and migrating to redfish bay or the wetland?

EA Response:
Appendix A (Exclusionary Criteria) has been removed from the document. Discussion of risks associated with the potential for migration of COPECs to Redfish Bay in the case of hurricanes and flooding during large storm events has been added to Section 2.2.5 under *Fate, Transport, and Media of Concern*.

EPA Comment No. 16 (4-11-14):
APP a Sub part B, #1: The AOC is bordered by an industrial dock area on one side; the remaining land bordering the site appears to be compacted soil, gravel, and pavement.

EA Response:
Appendix A (Exclusionary Criteria) has been removed from the document and additional discussions on the habitat at AOC-4 have been added throughout the document.

EPA Comment No. 17 (5-1-14):
The report mentions the background data that was collected for the metals and I have looked and have not found a table that contains the data used to calculate the background numbers being used in the report. I would like to have the data included and would suggest that it be presented as a results with statistics Table 18 and raw data Appendix A-2.

EA Response:
The following data has been added to the report and the SLERA AOC-4 has been revised to reflect these additions.

- Appendix A-2: Surface Soil Background Data

- Appendix C: ProUCL Statistical Data Output
  - Appendix C-1: All Field Data
  - Appendix C-2: Background Data for Chemicals of Potential Ecological Concern

EPA Comment No. 18 (5-30-14):
The following is a list of the remaining COPECs from the SLERA.

- **Terrestrial plants**—When 95 percent UCLM are compared to TRVs protective of terrestrial plants, barium, chromium, mercury, vanadium, and zinc are found in exceedance.

- **Soil invertebrates**—When 95 percent UCLM are compared to TRVs protective of soil invertebrates, barium, chromium, mercury, and zinc are found in exceedance.

- **Avian wildlife**—When 95 percent UCLM are compared to NOAELs protective of avian receptors, barium, cadmium, copper, lead, vanadium, and zinc are found in exceedance. When 95 percent UCLM are compared to LOAELs protective of avian receptors, vanadium and zinc are found in exceedance.

- **Mammalian wildlife**—When 95 percent UCLM are compared to NOAELs protective of mammalian receptors, zinc is found in exceedance. When 95 percent UCLM are compared to LOAELs protective of mammalian receptors, no chemicals are found in exceedance.

If you compare the maximum detected concentrations to the 95% UPL background concentrations you can eliminate barium, chromium, lead, and zinc. If you compare the 95 UPL background to the 95 UCL value you can eliminate vanadium. Vanadium is also below the TX specific soil background concentrations.

This means that the only remaining risk is mercury (terrestrial plants, and soil invertebrates) and copper for avian wildlife. The copper NOAEL HQ is just over one (HQ NOAEL+ 1.01) and the LOAEL HQ is well below one (6.60e-2), so this is acceptable.

The only remaining COPEC is mercury (Hg). The HQ for terrestrial plants is 3.92 and the HQ for soil invertebrates is 11.8. These values are not high, especially for a disturbed industrial property, but it would be nice to see if we can get the values below one using more realistic values typically used in a BERA. First of all we need to look at bioavailability. I am not a big fan of using AVS-SEM for mercury, but I believe that Klienfelter may have already done this and it would be a way of showing the mercury is not bioavailable. Another method would be to estimate bioavailability using organic carbon, pH and other soil characteristics. I would like to see if we can get both HQ values below one using more realistic values.

After this we need to revise the conclusion section of the SLERA to show that all COPECs are eliminated. The rest of the risk ecological risk assessment looks good.

EA Response:

The conclusion text has been modified based on EPA comments received by e-mail on 30 May 2014 and the EPA/EA conference call conducted on 2 June 2014. Starting at the bullets in the conclusion section (Section 3), the text has been changed to read:

- **Terrestrial plants**—When 95 percent UCLM are compared to TRVs protective of terrestrial plants, barium, chromium, mercury, vanadium, and zinc are found in exceedance.

- **Soil invertebrates**—When 95 percent UCLM are compared to TRVs protective of soil invertebrates, barium, chromium, mercury, and zinc are found in exceedance.

- **Avian wildlife**—When 95 percent UCLM are compared to NOAELs protective of avian receptors, barium, cadmium, copper, lead, vanadium, and zinc are found in exceedance. When 95 percent UCLM are compared to LOAELs protective of avian receptors, vanadium and zinc are found in exceedance.

- **Mammalian wildlife**—When 95 percent UCLM are compared to NOAELs protective of mammalian receptors, zinc is found in exceedance. When 95 percent

UCLM are compared to LOAELs protective of mammalian receptors, no chemicals are found in exceedance.

However, a number of factors identify that the potential for risk from these metals is minimal for AOC-4. Specifically, metal bioavailability and toxicity is likely over-estimated; site habitats are subject to non-chemical factors that limit habitat quality and would require extensive alteration to support higher quality habitat; and exceedances are limited in spatial distribution.

The maximum detected concentrations of barium, chromium, lead, and zinc did not exceed the 95% UPL background concentrations and would not warrant risk management. The vanadium 95 UCL (17 mg/kg) does not exceed the 95 UPL background, nor the Texas-specific soil background concentration (50 mg/kg; TCEQ 2014b) value; consequently, vanadium does not warrant risk management. The copper NOAEL HQ is just over one (HQ NOAEL 1.01) and the LOAEL HQ is well below one (0.07), so risks are acceptable.

The only remaining COPEC is mercury with HQs for terrestrial plants and soil invertebrates at 3.9 and 12, respectively. The maximum detected concentration was 1.5 mg/kg in sample SO4-01, which is three times the next highest concentration (0.47 mg/kg). Both site-specific and Texas-specific background values (0.02-0.04 mg/kg) are lower than any measured mercury at the site. While mercury concentrations at AOC 4 are high compared to background, they are not particularly high considering that the site is a disturbed industrial property. Site use is expected to preclude the area from being used as viable ecological habitat for plants and soil invertebrates, and use of the area is not expected to change in the future. Consequently, risk management of the site for mercury is not necessary at this time. Should site use be changed and the area becomes a viable habitat, then additional assessment for potential mercury risks should be considered.